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BAGS OF EASY OPEN CONSTRUCTION

BACKGROUND OF THE INVENTION

The present invention relates to bags or sacks, and in particular to plastic bags or sacks having an improved easily openable construction. The invention relates additionally to such bags or sacks which are able to stand stably and unsupported.

The bags of the present invention may be of any suitable size from relatively small (eg about 1 litre capacity or less) to large sacks and are very useful for, for example, industrial processing uses within and between factory premises, or for transporting food products between factory and retail premises, most especially for the food processing industry. The bags of the invention may also be suitable as the external packaging of certain solid and liquid consumer products (such as detergents). The bags may also find application in home delivery services, especially where it is sometimes necessary to return products by post to a supplier.

Plastic bags of many different types are known, but one particular problem has been in providing bags which incorporate an easily openable closure and which are easily and relatively cheaply manufactured, easy and reliable to use and, for some uses, suitable for containing relatively heavy materials. The present invention seeks to provide a bag which has a closure capable of meeting these requirements. The present invention further seeks to provide a bag which is additionally capable of standing upright and in a stable manner on a surface, especially while containing a

product which may, in particular uses, be a relatively heavy product

The bags of the present invention are particularly suitable for containing bulk products in the form of powders, granules or liquids. Examples of such products include bulk chemicals and bulk ingredients such as are used in human and animal foodstuffs and in household products such as washing powders and washing liquids; foodstuffs such as prepared or partially prepared foods; household products; and garden products such as peat or compost. In the food industry, plastic bags and sacks are especially used in the transport of food, ingredients or partially prepared food products around or between premises. In the context of this specification, bulk product may include retail consumer products such as liquid and solid detergents, dry foods, food ingredients and prepared foods for which the bags of the invention may form the external packaging. The quantity of the bulk product which the bag is adapted to contain will vary with the particular use and, for example, for prepared foods, the quantity may not be very large.

The present invention also relates to bags or sacks, and in particular to plastic bags or sacks which are able to stand stably on a surface when containing a solid or liquid product including in particular a relatively heavy product.

ACTS → **SUMMARY OF THE INVENTION**
Accordingly, the present invention provides in a first aspect a plastic bag comprising:

first and second side walls which together form a bag portion having front and rear faces;

a mouth formed at the front face of the bag for access to the interior of the bag; and

- 5 a closure flap overlying and closing the mouth and having a region which is peelably attached to the front face;

wherein at least a portion of the closure flap may be peeled away from the front face across the peelably attached region to reveal the mouth, such that the front
10 face remains functionally intact.

In one variation of this aspect of the invention the portion of the closure flap which may be peeled away from the front face is defined by at least one line of weakness extending through the peelably attached region
15 and along which the closure flap is torn to expose the mouth of the bag.

An alternative, second, aspect of the invention provides a plastic bag comprising:

20 first and second side walls which together form a bag portion having front and rear faces;

a mouth formed at the front face of the bag for access to the interior of the bag;

and a closure flap overlying and closing the mouth and having a region which is attached to the front face;

25 wherein the closure flap includes at least one line of weakness defining a portion of the flap which does not

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include any part of the region which is attached to the front face and which portion can be opened by tearing along the line of weakness to expose the mouth of the bag.

5 In one embodiment of these aspects of the invention the closure flap includes a line of weakness in the form of an arc extending from points on the closure flap proximate the mouth towards an end edge of the closure flap.

10 In order to facilitate opening of the bag, the bag preferably includes at least one finger hole formed in the closure flap on the above line of weakness by means of which the closure flap may be gripped for tearing.

15 In another embodiment of these aspects of the invention said portion (that is, the peelable portion of the first aspect or the portion defined by at least one line of weakness of the second aspect) is defined by at least two lines of weakness in the closure flap along which the closure flap is torn to expose the mouth of the bag.

20 Preferably in this embodiment the lines of weakness terminate in one or more finger holes formed in the closure flap, by means of which the closure flap may be gripped for tearing. This construction facilitates opening of the bag.

25 In an alternative preferred construction according to the first aspect of the invention in the above embodiment the lines of weakness extend from an end edge of the closure flap to points proximate the mouth.

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Other possible constructions for the lines of weakness and the closure flap include the following:

the lines of weakness may be substantially straight and substantially parallel to the edges of the bag; or

- 5 the ends of the lines of weakness at the end edge of the closure flap are spaced further apart than the ends of the lines of weakness proximate the mouth; or

- 10 the ends of the lines of weakness at the end edge of the closure flap are so spaced apart as to define a finger tab by means of which the closure flap may be gripped for tearing; and/or

the closure flap is sealed to the front face along portions of its end edge extending from respective lines of weakness to the sides of the bag.

- 15 In one particularly preferred construction, the line or lines of weakness are so shaped that the portion of the closure flap defined thereby adopts the shape of a dispensing spout when torn along the line or lines of weakness.

- 20 In a particularly preferred embodiment of the first aspect of the invention the portion of the closure flap which may be peeled away is attached to the front face by means of a peelable adhesive. A hot melt adhesive is particularly preferred. Alternatively, the portion of
- 25 the closure flap which may be peeled away may be attached to the front face by means of a peelable heat weld or peelable heat sealed region.

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In particularly preferred embodiments of the invention, the lines of weakness are perforations formed in the closure flap. Alternatively, the lines of weakness may comprise lines where the material of the closure flap is made thinner, or scored lines in the material of the closure flap.

In a particularly useful embodiment of the invention, the plastic bag further comprises a closeable region formed at a first end of the bag for closing the bag after filling. This construction allows the bag to be filled from the same end as the easy-open portion and for that end to be sealed after filling. Also, other advantageous constructions may thus be formed at the other end of the bag, especially constructions which will not permit filling of the bag from that other end. The closeable region may be closed by any suitable means. Examples of suitable means for closing the closeable region include heat sealing, adhesive (eg an adhesive layer initially covered by a removable protective tape) and snap-fit fastening means such as those extending along the width of the closeable region and comprising a male component on one side and a female component on the other which components snap together to form a closure.

A further preferred embodiment of the invention provides that the first side wall forms the front of the bag, and the second side wall forms the rear of the bag, the said side walls being of substantially the same length.

In a preferred construction according to this embodiment the mouth comprises a slit formed in the front face.

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Alternatively, the bag may comprise a further line of weakness, formed in the front face, which line of weakness may be ruptured to form the mouth.

5 The closeable region may include end parts of the first and second side walls. These end parts may, for example, be heat sealed to close the bag after filling. In some constructions the closeable region may further include an end part of the closure flap, which may then also form part of the heat seal (or other closure means).

10 In an alternative preferred embodiment the first side wall forms the front of the bag, the second side wall forms the rear of the bag and the second side wall has an extension beyond the bag portion. This extension can then cooperate with the closure flap and the first side wall in defining the mouth and forming the easily openable closure. Thus, preferably, the closure flap overlies a part of the first side wall and said extension of the second side wall.

20 In this way, the mouth is defined by the end edge of the first side wall and the said end edge is revealed when the closure flap is peeled back, thereby allowing access to the interior of the bag.

25 In this construction preferably also the closeable region includes the extension of the second side wall and an end part of the closure flap.

Handles for carrying the bag may be formed in or near (for example, just above) the closeable region, such as by cutting, punching or otherwise forming suitable holes in the first and second side walls, the extension to the

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second side wall or the closure flap (as appropriate for the particular construction). Alternatively, separate handles may be attached to, or near, the closeable region.

- 5 In one more particularly preferred embodiment of the above aspects of the invention the bag further comprises a second flap depending by means of a boundary fold from an edge of the mouth and extending into the interior of the bag.

- 10 Most preferably, the second flap is attachable by means of an adhesive to the inside face of the second side wall. Desirably, said adhesive is a peelable adhesive.

- A further preferred embodiment of the first aspect of the invention provides that on the portion of the closure
15 flap which may be peeled away, any path extending from the boundary of the said portion nearest to the mouth to the boundary of the said portion distant from said mouth must pass through a peelably attached region.

- Also, in another preferred embodiment of the first aspect
20 of the invention a path along the first side wall substantially parallel to and adjacent to the mouth lies entirely in a peelably attached region, at least within the peelable portion of the closure flap. These
embodiments ensure that there is an uninterrupted seal
25 (by means of the peelable adhesive) across the whole width of the peelable region so that, for example, there is no route by which powder or liquid product may escape through the easy-open closure.

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In use of the bags of the invention it is advantageous for the bags to be able to stand stably and unsupported during and after filling. Accordingly, one much preferred embodiment of the invention provides that the
5 bag further comprises a base portion formed at an end of the bag distant from the closeable region and operative to provide a substantially flat region on which the bag may stand stably.

In a preferred construction according to this embodiment,
10 the base portion comprises:

a base panel connected along opposing sides thereof to the respective first and second side walls by means of first folds, said panel further having a second fold, co-extensive with the width of said side walls and
15 substantially parallel to said first folds, said second fold dividing the base panel into first and second panel leaves, such that the second fold and the panel leaves lie between said side walls with the external faces of the panel leaves towards each other; and

20 mitre seals comprising a seal line extending from each end of said second fold to each first fold, along which seal lines the first and second side walls are respectively joined to the base panel.

The mitre seals form mitred corners which may be removed
25 if necessary in order to improve the palletisation of the bag, but this is not essential. That is to say, the bags of the present invention may be required to be suitable for transportation on a pallet and in order to retain the bags on the pallet a number of bags comprising a pallet

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load are often shrink wrapped (or otherwise wrapped) on the pallet. In bags of the prior art (without a stable, flat base), in the absence of mitre seals, product contained in the bag is able to fill the bag right into the corners. This makes the corners stiff and sharp so that the corners will tend to cut or tear the shrink wrapping and/or adjacent bags. Thus some prior art bags (without the flat base construction according to the present invention) have included mitre seals at the corners, to prevent product from passing right into the corners. In this way, the corners, although still sharp, are flexible and less likely to cause damage. In the present invention, the mitre seals are an integral part of forming the flat stable base, but may also serve to add flexibility to the corners for improved palletisation. Removing the mitred corners can provide a further improvement in palletisation, but is not essential. Similarly, where the bags of the invention form the external packaging of consumer products, the mitred corners can be removed to avoid sharp corners which are inconvenient to the consumer and to allow the bags to be more easily stacked on the shelves of shops and supermarkets.

The preferred construction according to the invention where the bag includes a flat, stable base portion may alternatively be defined with the bag in its expanded condition for filling. Thus, in this construction the base portion comprises a generally rectangular base panel having opposed side edges and opposed end edges and generally triangular end wall portions each depending along a base side thereof from a respective end edge of

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the base panel, said base panel being connected to the respective first and second side walls by means of first folds coincident with said respective side edges, said triangular end wall portions having an apex positioned in use above said base panel, and having side edges comprising seal lines extending between said apex and respective corners of said base portion along which the first and second side walls are respectively joined to the said end wall portions.

10 In both the former and the latter constructions, the base panel is preferably, but not essentially, formed integrally with the first side walls.

In the former and latter constructions according this embodiment, preferably the seal lines (of the mitre seals) comprise a heat weld.

Desirably the seal line of the mitre seals (as defined in the former construction) forms an angle of between 30° and 60° with respect to the second fold and more especially the seal line of the mitre seals forms as angle of 45° with respect to the second fold.

In embodiments of the invention wherein there is no closeable region and the first and second side walls are of substantially the same length, the mouth may preferably be defined by the end edge of the first side wall. This is preferably achieved by providing that the closure flap depends from the second side wall. Most preferably the closure flap is formed integrally with the second side wall and depends from the second side wall along a fold. This fold is thus most preferably

substantially parallel to and adjacent to the end edge of the first side wall which defines the mouth.

In constructions of the bag where there is no requirement to provide a stable base, the bag may be constructed so that it is openable also at an end of the bag, separately from the easy-open closure. In this construction, the bag is further provided with a third flap overlying and peelably attached to the first or second side wall, which third flap depends from the respective second or first side wall at an end of the bag spaced apart from the closure flap.

In an alternative definition of some of the bags of the first aspect of the invention, the plastic bag comprises first and second confronting side walls having substantially coincident end boundary edges and a closure flap overlying an end region of the first side wall, depending from the end boundary edge of the second side wall, including a first fold substantially parallel to and adjacent to the end boundary edges and having a region which is peelably attached to the first side wall, the first and second side walls being attached along their side edges and wherein at least a portion of the closure flap may be peeled away from the first side wall across the peelably attached region to expose the interior of the bag such that the first side wall remains functionally intact.

In an alternative definition of some of the bags of the second aspect of the invention the plastic bag comprises first and second confronting side walls having substantially coincident end boundary edges; and a

closure flap overlying an end region of the first side wall, depending from the end boundary edge of the second side wall, including a first fold substantially parallel to and adjacent to the end boundary edges and having a region which is attached to the first side wall; the first and second side walls being attached along their side edges; and wherein the closure flap includes at least one line of weakness defining a portion of the flap which does not include any part of the region which is attached to the first side and which can be opened by tearing along the line of weakness to expose the interior of the bag.

INS *BRIEF DESCRIPTION OF THE DRAWING FIGURES*

For a better understanding of the invention, and to show how the same may be carried into effect, reference will be made (by way of example only) to the following drawings, in which:

Figure 1 is a schematic perspective view of a bag according to one variation of the invention;

Figure 2 is a sectional view along line A-A of Figure 1;

Figure 3 is a schematic plan view of a bag according to another variation of the invention illustrating one line of weakness in the closure flap;

Figure 4 is a schematic plan view of a bag according to another variation of the invention illustrating two lines of weakness in the closure flap;

Figure 5 is a schematic plan view of a bag according to a further variation of the invention;

Figure 6 is a schematic plan view of a bag according to another variation of the invention;

Figure 7 is a section along the line D-D of Figure 6;

Figure 8 is a section along the line B-B of Figure 6;

5 Figure 9 is a plan view of the bag of Figure 5 in an open condition;

Figure 10 is a plan view of the bag of Figure 6 in an open condition;

10 Figure 11 is a schematic plan view of a bag according to another variation of the invention sealable to both ends;

Figure 12 is a sectional view along the line E-E of Figure 11;

Figure 13 is a schematic plan view of part of a bag according to a further embodiment of the invention;

15 Figure 14 is a section along the line A-A of Figure 13;

Figure 15 is a view of a part of a bag according to Figure 13 in an open condition;

20 Figure 16 is a schematic plan view of a bag according to the invention incorporating the base construction of Figures 13 to 15;

Figure 17a is a section along line F-F of Figure 16;

Figures 17b and 17c illustrate variations of the bag of Figures 16 and 17a;

Figure 18 is a schematic plan view of a bag according to

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the invention of similar construction to the bag of Figure 16;

Figures 19 to 22 illustrate methods of making bags according to the invention;

- 5 Figure 23 is a schematic plan view of a bag according to the invention where the mouth is not adjacent an end of the bag; and

Figure 24 illustrates one method of making the bag of Figure 23.

*DETAILED DESCRIPTION OF THE DRAWING FIGURES AND
PREFERRED EMBODIMENTS*

- 10 In this application, unless indicated otherwise, or unless the context requires otherwise, the bags of the invention are described and defined in relation to their flat condition before filling. That is, the bags are described and defined in a configuration in which the
- 15 side walls lie flat against each other with substantially no gap there between. Clearly, as the bag is filled with product, the side walls of the bag become separated and the configuration of the bag is changed.

- 20 Figures 1 to 12 illustrate bags of a construction where the base portion for stable standing is not required. In these figures, the bag 200 comprises a bag portion 200A and a closure flap 205. The bag portion 200A is formed with a first side wall 201 and a second side wall 202. The walls 201 and 202 are confronting in that they lie
- 25 one over the other and in these embodiments the side walls 201, 202 are of the same length. Walls 201, 202 are joined together along their side edges 203, 204 by, for example, heat seals (the heat seals along side edges 203 and 204 are not specifically illustrated for reasons

of clarity). In an alternative configuration, the walls of the bag portion may be formed as a tube so that there is no distinct joint or seal along their sides.

The closure flap 205 overlies an end region of the first side wall 201 and in these embodiments depends from the second side wall 202 at the end boundary edge 206 of the second side wall 202. The closure flap 205 may be attached to the second side wall by means of a joint but in these embodiments preferably the closure flap 205 is formed integrally with the second side wall 202 and depends from the second side wall 202 by means of a fold 207. It can be seen that the fold 207 is then adjacent to and substantially parallel to the end edge 209 of the first side wall 201. (In Figures 2, 7, 8 and 12, the spacing between the first side wall 201, and the second side wall 202, and the closure flap 205 is exaggerated for reasons of clarity). The end edge 209 defines the mouth of the bag 200 when the bag is opened. An optional second flap 208 extending into the interior 211 of the bag 200 is attached to the end boundary edge 209 of the first side wall (ie to the boundary edge of the mouth) by means of a boundary fold 210. The end edge 222 of the second flap 208 is illustrated by a dotted line in Figures 5 and 6.

The closure flap 205 is adhered to the first side wall 201 by means of a peelably attached region or regions 215. The peelably attached region 215 may take a variety of forms but preferably comprises a peelable adhesive and most preferably a hot melt adhesive. The peelable adhesive may be applied to either the surface of the

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first side wall 201 or the surface of the closure flap 205, or to both. Other examples of peelable adhesives may include a pressure sensitive adhesive which comprises two non-tacky components, a first of which is applied to the closure flap and the second of which is applied to the first side wall. When the two components are brought together and pressure is applied, an adhesive bond is formed. Alternatively the peelable adhesive may be a permanent or non-permanent adhesive or solvent adhesive applied to either the surface of the first side wall 201 or the surface of the closure flap 205 or both.

The region or regions of peelable adhesive 215 may be of a number of different suitable shapes. For example, the region 215 may occupy the whole area of the first side wall 201 which lies underneath the closure flap 205, or only a part of that region. Regions of peelable adhesive may be in the form of strips or stripes extending laterally across the first side wall or extending diagonally or in curved (wave-like) paths. The regions of peelable adhesive may also be intermittent across the first side wall.

It is preferred that the region or regions of peelable adhesive are such that it is not possible to trace a path along the surface of the first side wall 201 from its end boundary edge 209 (ie from the mouth) to the edge of the closure flap 213 (ie the edge distant from the mouth) which path does not cross a region of peelable adhesive. Where, as described further below, only a portion of the closure flap is peeled away, the above-mentioned path may apply only to that portion.

It is particularly preferred that a continuous region of peelable adhesive is provided substantially parallel to and adjacent to the end boundary edge 209 of the first side wall 201 (ie adjacent to the mouth), as may be particularly seen in Figure 5. This construction assists in ensuring the integrity of the closure.

The region or regions of peelable adhesive 215 may also be selected to be re-sealable, so that the bag may be re-closed after opening by means of the region or regions of peelable adhesive 215.

For example, the transfer of permanent or non-permanent adhesive, hot melt or solvent adhesive applied to either the surface of the first side wall 201 or the surface of the closure flap 205 or both may also occur on opening the bag thereby allowing the bag to be resealed.

Alternative constructions for the peelably attached region 215 also include the use specific adhesives whose adhesive properties vary according to the surrounding temperature, thereby allowing the bags to be used at extremes of temperature. In some cases, these adhesives may not be peelable at room temperature.

Alternative constructions for the peelably attached region 215 also include the use of adhesives which are frangible.

Alternative constructions for the peelably attached region 215 include peelable heat welded and peelable heat sealed regions. In order to provide a peelable heat weld or heat seal, the strength of the weld or seal may need to be weakened to some extent. This may be achieved by

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interposing some sort of contaminant between the materials to be welded or sealed. The contaminant may be chosen from a wide variety of materials but examples include inks and lacquers or a third film layer which
5 welds less strongly to the layers of material than the materials weld to themselves.

Referring specifically now to Figures 1 and 2, the illustrated bag may be opened simply by peeling back the closure flap 205 through the peelably attached regions
10 215 to reveal the mouth 221. In this and other embodiments of the invention, where a peelable adhesive is used, the adhesive is selected so that its cohesive strength is less than its adhesive strength. Thus, in the embodiment of Figures 1 and 2, as the closure flap is
15 gripped at its leading edge 213 and pulled, it is separated from the first side wall 201 in the peelable region 215 without substantial damage occurring to the closure flap 205 or to the first side wall 201. Thus neither the closure flap 205 nor the first side wall 201
20 is torn and although each may be somewhat distorted, any distortion of the first side wall 201 is not significant in terms of its function.

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In this and other embodiments the optional second flap 208 assists in maintaining the integrity of the closure
25 when the bag 200 is filled with its contents. Second flap 208 is effective in preventing the contents of the bag from penetrating to an excessive extent between the first side wall 201 and the closure flap 205 around the region of the first fold 207, which might otherwise cause
30 distortion the side wall 201 and/or the closure flap 205

8) so that they could become separated at the peelable region 215. The bag closure could then be breached, allowing the contents to leak or spill.

In particularly preferred variations of the invention the closure flap 205 is provided with one or more lines of weakness along which the closure flap 205 may be torn in order to open the bag and expose its interior. The lines of weakness preferably take the form of perforations in the closure flap 205.

10 Referring now to Figures 3 and 4, a bag is illustrated incorporating only one line of weakness. The line of weakness 216 is in the form of an arc extending from points W-W near the mouth and the first fold 207 through the peelably attached region 215 towards the edge 213 of closure flap 205. Line of weakness 216 defines a portion 15 219 of the closure flap which may be gripped and peeled away by tearing along the line of weakness 216 to open the bag. Preferably, the ends of the line of weakness 216 do not extend beyond the peelable region 215 towards the mouth in order to preserve the integrity of the 20 closure and to prevent product leakage.

In order to facilitate opening of the bag, the embodiment illustrated in Figure 4 includes a finger hole 250 by means of which the closure flap 205 may be gripped in order to begin tearing along the line of weakness 216. 25 Alternatively, a tab may be attached at a similar point which tab may be gripped with the fingers to begin tearing. As indicated in Figure 4, a line of permanent adhesive 240 may be provided between end edge 213 of the closure flap and the line or lines of weakness 216 in 30

order to assist in retaining the closure flap 205 prior to opening the bag 200.

In an alternative embodiment of the invention to that illustrated in Figure 4 it may be desirable to refrain from the use of adhesive in the region of the closure flap defined by the line of weakness 216. In this case, the closure flap 205 must be sealed to the first side wall 201 (such as by non-peelable adhesive or heat seals) in the area outside the portion 219, in order to provide the necessary closure. For example, this may be achieved by means of the line of permanent adhesive 240 and seals at side edges 205A, 205B.

Referring now to Figures 5 to 10 variations of the bags of the invention are illustrated in which the bags include two lines of weakness 216A, 216B which define a portion 219 of the closure flap which may be peeled away along the lines of weakness to open the bag. Additional features which may be incorporated into other embodiments of the invention are also illustrated. In this respect, the closure flap 205 may be sealed to the first side wall 201 at its end edge 213 by means of seals 212A, 212B (Figure 6) and at its side edges 205A, 205B (Figure 5), but these are not always essential. Seals 212A and 212B are preferably heat seals, however, adhesive seals, utilising permanent or non-permanent adhesive may also be employed. Mitre seals 217 may be formed across the corners of the bag, preferably by heat sealing. The mitre seals 217 can create softer corners on the bag when the bag is filled with product, which is preferred for palletisation of the bags. The corners of the bag beyond

the mitre seals 217 may be removed if desired.

Indicated in Figures 5 and 6 by dotted lines 216A, 216B the lines of weakness extend from the end edge 213 of the closure flap through the adhesive region 215.

- 5 Preferably, the lines of weakness 216A, 216B do not extend beyond the peelable region 215 towards the mouth and the fold 207 in order to preserve the integrity of the closure and to prevent product leakage.

- 10 When it is desired to empty the contents from the bag, the bag is opened by gripping the closure flap 205 at the appropriate place and peeling back the closure flap 205 or the portion 219 thereof. Specifically, in Figures 5 and 6 when the end edge 213 of the closure flap 205 is gripped at portion 219 and pulled, the closure flap 205
15 tears along the lines of weakness 216A, 216B and portion 219 is separated from the remaining parts 220 of the closure flap 205. Especially where, as in Figure 6, the end edge 213 of the closure flap 205 is sealed to the first side wall 201 by means of seals 212A and 212B, the
20 unsealed portion 214 acts as a finger tab by means of which the closure flap 205 can be gripped. The portion 219 can then be separated by tearing along the lines of weakness 216A, 216B as far as the peelable region, so that the bag attains the open configuration as shown in
25 Figures 9 and 10 in which the mouth 221 is revealed.

- As in the above embodiments, the peelable adhesive is selected so that its cohesive strength is less than its adhesive strength, so that (with reference to the embodiment of Figures 3 to 12) as the portion 219
30 continues to be pulled the portion 219 is separated from

the first side wall 201 in the peelable region 215 without substantial damage occurring to the portion 219 or the first side wall 201. That is, the first side wall 201 and the portion 219 are not torn (except along the lines of weakness 216, 216A, 216B) or significantly distorted and the first side wall 201 remains functionally intact. When the lines of weakness have been torn along their full length, the portion 219 can be opened out (eg at fold 207) so that it can act as a dispensing spout for contents of the bag dispensed through mouth 221 formed between first side wall 201 and second side wall 202, as may best be seen from Figures 9 and 10. In Figures 9 and 10, various features such as mitre seals 217 and adhesive region(s) 215 have been omitted for improved clarity.

As can be seen especially in Figures 9 and 10 the mouth 221 through which product may be dispensed from the bag 200 after opening of the closure flap 205 is defined by the end edge, or part of the end edge 209 of the first side wall 201, in combination with the interior face of the second side wall 202.

Other constructions for the mouth 221 are possible. Thus, the mouth 221 may be formed as a slit in the first side wall 201 which slit is preferably (but need not essentially be) close to the end edge 209. The closure flap 205 will then overlies the slit and be peeled back through a peelable region to reveal the slit. In this construction, the closure flap 205 does not necessarily have to depend from the second side wall 202 but may, for example, include a portion beyond the slit (in the

direction of tearing the closure flap) which is permanently adhered to the first side wall. In this latter construction, alternative means are required to close the end of the bag beyond the slit. Such means may include the closeable region described with respect to later embodiments of the invention.

In Figures 3 to 10, the portion of the closure flap 205 outside the peelable portion 219, may be attached to the first side wall 201 by non-peelable means such as, for example, a non-peelable heat seal or a non-peelable adhesive.

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The second flap 208 may also be used to provide means for re-closing the bag after opening. In particular, the second closure flap 208 may be provided with a layer of adhesive (not illustrated) which may be used to adhere the second flap 208 to the inner face of the ~~first~~ ^{second} side wall 202. Depending on the intended use of the bag, the adhesive applied to the second flap 208 may be peelable or permanent (non-peelable). A peelable adhesive may be employed to provide an even more secure closure for the bag, before opening. More preferably the adhesive (peelable or non-peelable) applied to the second flap 208 may initially be covered by a protective tape such as of a plastics material or a coated paper. The protective tape prevents the adhesive from adhering the second flap 208 to the second side wall 202. When it is desired to re-close the bag, the protective tape is simply peeled away to expose the adhesive, which may then stick to the second side wall 202. This latter construction is particularly advantageous when the bags of the invention

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are used for containing mail-order goods, as will be described more fully below.

Referring now to Figures 11 and 12, a still further variation of the invention is illustrated in which the bag 200 is provided with a third flap 280 at the end of the bag distant from the first fold 207. The third flap may depend from the first or second side walls 201, 202 and is attached to the respective second or first side walls 202, 201 by means such as adhesive region 300. The adhesive is preferably a peelable adhesive. The third flap 280 includes a fold 290.

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In the use of this flap, goods may first of all be inserted into the bag via initially open end 218 which end 218 is then closed by means of the third flap 280.

The goods are then transported or stored as required in the bag and, when required are accessed by peeling back closure flap 205 or peelable portion 219, as previously described to reveal mouth 221. If the goods need to be repacked in the bag, such as, for example, unwanted goods

which are to be returned to the mail order supplier, they may be placed in the bag again through the mouth 221.

The mouth 221 is then resealed by means of adhesive provided on second flap 208. Additionally or alternatively adhesive on the peelable portion 219, may

be used to reseal the bag. In this case, the peelable adhesive may be resealable and/or an additional area of adhesive may be provided on the portion 219 or on first side wall 201, which is protected by means such as a protective tape which tape is removed before resealing.

When access to the goods is again required, such as for

B3 returned goods at the mail order company, the bag may be opened by peeling or tearing back third flap 280.

Referring now in particular to Figures 13 and 14, which show the base part of a bag according to one embodiment of the invention. The mouth, closure flap and associated constructional details are omitted from these figures for reasons of clarity. In these figures the bag 901 is shown in a flat condition prior to filling. The bag 901 comprises a closure end 902 (which in the bag of the invention will incorporate the easily openable closure), a base panel 903, first and second side walls 904a, 904b and side edges 905a, 905b. Side walls 904a, 904b are joined at marginal edges 905a, 905b along their entire length by suitable means such as heat welding and/or adhesive and preferably by heat welding. However, in alternative constructions, the joins may be located elsewhere than the side edges, or, where the body of the bags is produced in the form of a tube, may be absent.

The base panel 903 comprises a tuck defined by first folds 909' and 909" and second fold 990. The tuck has panel leaves or tuck leaves 906a and 906b each having two mitred edges 907. Mitred edges 907 are mitre seals comprising a seal line extending from each end of the second fold 990 (that is, at point X) to the first folds 909', 909" at points Y. The mitred edges 907 thus form internal corner boundary edges of the bag. The side walls 904a, 904b are joined to the base panel 903 along these seal lines which preferably comprise heat welds. As can best be seen in Figure 14, second fold 990 and panel leaves 906a, 906b lie between the side walls 904a,

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904b with the external faces of the panel leaves 906a, 906b towards each other.

In the illustrated embodiment the first and second side walls 904a, 904b and the base panel 903 are unitary in that there is no intervening joint in a path passing from the illustrated limit of side wall 904a at the closure end to the fold 909', the fold 990 and the fold 909" and then to the illustrated limit of the side wall 904b at the closure end of the bag.

In less preferred constructions, side walls 904a and 904b may not for example be unitary in that the above defined path may be interrupted by a joint formed for example along fold line 990 or along or near to folds 909', 909".

When the bag is in its flat condition illustrated in Figures 13 and 14, the mitred edge 907 preferably forms an angle of between 30° and 60°, most preferably 45° with respect to the second fold 990.

Figure 15 illustrates a bag part similar to that of Figures 1 and 2, but in a substantially fully open condition containing, or ready to receive, a product. Side walls 904a, 904b no longer lie substantially flat against each other as in Figures 13 and 14, but are spaced apart from one another. In the embodiment illustrated the side edges 904a and 904b are joined to each other along side edges 905a and 905b. The joints preferably comprise heat welds along the whole length of side edges 905a, 905b although other joining means such as adhesive may additionally or alternatively be used.

Upper edges of side walls 904a, 904b will form the closure end of the bag and no constructional details are shown in this figure, for reasons of clarity. A substantially rectangular base portion 908 (which is part of the base panel 903) on which the bag may rest in an upright position is defined by fold lines 909', 909" and 910', 910" and is formed by opening out panel leaves 906a, 906b of Figures 13 and 14. Mitred edges 907 now lie above a horizontal plane, preferably tending towards a vertical plane, although filling of the bag may cause the mitred edges 907 to be displaced further from the vertical. Mitred edges 907 and fold lines 910', 910" define upstanding generally triangular end wall portions 911a, 911b. Fold lines 910', 910" form the base side of portions 911a, 911b and mitred edges 907 form the remaining sides with the apex of the triangles at points X. Thus, in the embodiment illustrated the apex of the triangular end wall portions 911a, 911b lie above the base portion 908 in use. Portions 911a, 911b are formed by an opening out of the panel leaves 906a, 906b and comprise end regions of the base panel 903. Preferably, the mitred edges 907 form an angle of between 30° and 60° with respect to the fold lines 910', 910". Additional reinforcements (such as reinforcement welds or adhered reinforcement patches) may be provided where desired such as at points X where the welds of mitred edges 907 meet the welds of marginal edges 905a, 905b.

The mitred corner portion 912 formed by mitred edges 907 and illustrated in dotted lines in Figure 13 may be removed if desired for improved palletisation, but this is not essential. If not removed, in the bag of Figure

15 the portions 912 simply form an extra triangular layer (not illustrated) overlying points Y-X-Y.

Thus, by means of this embodiment of the invention it is possible to provide a bag which can stand stably in an upright position, which is suitable for carrying heavy and bulky materials, which is simple and cost effective to manufacture in an automated process and which provides excellent palletisation properties.

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10 This variation of the invention provides a bag having an easily openable closure portion and a stable, flat base portion. This type of bag is particularly suited for the transport of partially prepared food products within a factory and of prepared food products between factory and retail premises. An example of such a bag when complete
15 is illustrated in Figures 16, 17 and 18. Other suitable uses will be readily apparent to those skilled in the art. Features which are identical to or similar to those of Figures 13, 14 and 15 have not been specifically identified and will not be described again in detail.

20 Essentially, the bags of this embodiment of the invention combine the stable flat base with an easily openable closure which is the same as, or similar to, that described above and further provide an area by means of which the bag can be sealed after filling without
25 disturbing the easily openable closure.

Referring now to Figures 16 and 17a, the bag 500 incorporates a flat, stable base portion 508, the construction of which is preferably as described with reference to Figures 13, 14 and 15. The bag has a bag

portion 500A comprising a first side wall 501 and a second side wall 502. A closure flap⁵⁰⁵ is attached to the first side wall 501 to form a closure over the mouth 521. The second side wall 502 includes an extension 553 beyond the bag portion 500A and so the mouth is defined by the end edge 509 of the first side wall 501, in combination with the interior face 502A of the second side wall 502. The closure flap 505 is attached to the first side wall 501 in any of the ways described above which allow it, or a portion of it, to be peeled back to reveal the mouth 521 while allowing the first side wall 501 to remain functionally intact. Thus, the closure flap 505 may be attached to the first side wall 501 by means of a peelable adhesive, as in the first aspect of the invention, or the peelable adhesive may be absent, as in the second aspect of the invention. Most preferably, the closure flap 505 is attached by means of peelable adhesive 515. The closure flap 505 is preferably tearable along lines of weakness 516, which lines 516 are most preferably in the form of perforations. The bags of this embodiment may also include a flap 528 at the boundary of the mouth 521, which flap 528 is functionally equivalent to the flap 208 of the previously described embodiments.

In the illustrated embodiment of Figures 17a-c, the bag is closed by means of a closeable region 550. The actual closure may be effected by any suitable means 551, such as adhesive or heat sealing. In the embodiment of Figure 17a, the closeable region is formed from an end part 552 of the closure flap 505 and the extension 553 of the second side wall 502. The extension 553 extends beyond

the bag portion 500A and is most preferably formed integrally with the second side wall 502.

In use of the bag, the closeable region 550 is initially open to allow the bag to be filled. When the desired contents have been placed in the bag, the closeable region 550 is closed by the appropriate means 551. When access is required to the contents of the bag, the closure flap 505, or the portion 519 thereof (in the embodiment illustrated), is peeled back to reveal the mouth, so that the contents may be dispensed.

Other constructions of the closeable region are possible. For example, the first and second side walls 501, 502 may be of the same length so that there is no extension 553. In this case, the mouth 521 is formed as a slit or cut in the first side wall 501 and the closure flap 505 overlies the slit or cut. Thus, the closeable region may be formed by end parts of the first side wall 501, the second side wall 502 and the closure flap 505. This construction is illustrated in Figure 17b. In another variation illustrated in Figure 17c, the slit or cut forming mouth 521 may be spaced further from the ends of the side walls 501, 502 (that is, nearer to portion 508). In this case, the closure flap 505 may also be spaced further from the said ends 509, 510 of side walls 501, 502 and need not overlie the said ends. The closeable region 550 may then comprise only the end regions of the side walls 501, 502. In this variation, the closure flap 505 must be attached to the first side wall 501 on both sides of the slit, with a portion at at least one side being peelable or otherwise removable to reveal the slit,

while leaving the first side wall 501 functionally intact. In this variation as illustrated in Figure 17c, the closure flap 505 is peelably attached by means of peelable adhesive 515 and permanently attached by suitable means at 554.

A further variation of the bag of this embodiment is illustrated in Figure 18. This bag differs from that of Figure 17 only by the provision of handles 560. These handles may be punched, cut or otherwise formed towards the top of the bag, preferably just above the closeable region 550. As an alternative, separate handles may be attached to the bag in or near the closeable region.

Methods of production of the bags according to the invention will now be outlined, although it should be noted that the bags of the invention are not confined to these methods.

Initially, a method of producing the bags of Figures 1 to 12 will be described in outline, with particular reference to Figure 19. A web 600 of plastics film is extruded and is folded over at 601 to the configuration shown in Figure 19A. An optional second fold 602 is then made which will ultimately provide the optional second flap 208 (Figures 2, 7, 8) (Fig 19B). Next, one or more areas of peelable adhesive 603 (such as a hot melt adhesive) are applied to the surface of the bag (Fig 19C) and the perforations 604 are formed (Fig 19D) which provide the lines of weakness 216 (Figs 3, 4, 5, 6). The portion 605 of the web 600 is then folded over and adhered by the peelable adhesive 603 (Fig 19E). The web 600 is cut near first fold 601 to provide the open end

606 of the bag, by means of which the bag may ultimately be filled (Figure 19F). The web is finally sectioned into bags of appropriate width and heat seals (or other seals) are formed at the sides to result in the final bag.

Two methods of production of the bags according to Figures 16, 17 and 18 will now be described. In the first method, illustrated in Figure 20, a web 700 is first folded at fold 701 (Fig 20A). A tuck 702 is then formed from the fold 701 (Fig 20B) and mitre seals 703 are formed at the corners of the tuck portions (Fig 20C). A portion 704 of web 700 (indicated by dotted line) is then removed (Fig 20D) and peelable adhesive 705 is applied to the surface of the web 700 (Fig 20E). An additional web 706 incorporating lines of weakness 716 is then applied to the peelable adhesive and to overlies the area 707 of the web (Fig 20F). Finally the web is sectioned and the resulting side edges are closed (such as by heat sealing) to form the final bags. The parts 706 and 707 provide the closeable region 708 (Fig 20G).

In an alternative, less preferred, method illustrated in Figure 21, the steps illustrated in Figs 21A to 21E are the same or similar to those of Figs 20A to 20E. In the step illustrated in Figure 21F, perforations 709 (which form the lines of weakness 216) are formed in the part 707, which part 707 is then folded over at fold 710 (Fig 21G) and adhered to the peelable adhesive 705. The web 700 is then cut in the region of fold 710 to provide the opening of the bag (Fig 21H). The fold 710 is so spaced from the end of the web 700 at 711 as to allow for a

closeable region 712 after the fold 710 has been cut off. The web is then sectioned and the side edges sealed as previously described in relation to Figure 20G.

5 In Figure 22, a method of making a bag similar to the bag of Figures 1 to 12 is illustrated. For this bag, the mouth is spaced from the ends of the bag, although the method can be adapted to position the mouth nearer to the ends of the bag.

10 Referring now to Figure 22, a web 750 of plastics film is extruded and is folded over at folds 751 and 752 to the configuration shown in Figure 22A. In Figure 22A, the spacing of the end edges 753, 754 of the web 750 is exaggerated for reasons of clarity. An optional third fold forming an optional second flap depending from edge 15 753 or 754 may also be included. This second flap is similar in construction and operation to the second flap depending from fold 602 in Figure 19.

20 Next, one or more areas of peelable adhesive 755 (such as a hot melt adhesive) are applied to the surface of the bag. Adhesive 756 is also applied at the opposite side of gap 757, which adhesive 757 may be peelable or permanent (Figure 22B). An additional web 758 is then applied to the adhesive regions 755, 756 to overlie (and close) the gap 757. The additional web includes lines of 25 weakness 759 (Figure 22C). Finally, the web 750 is sectioned to form individual bags and one side 760 is sealed, such as by heat sealing or adhesive (Figure 22D). The other end 761 is open for filling the bag and may be closed in region 762 after filling of the bag (Figure 30 22E). In an alternative variation, after the step

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illustrated in Figure 22C, the web 750 may be sectioned as in Figure 22D to form individual bags, and both the side edges 761 and 763 may then be sealed, such as by adhesive or heat sealing. In this variation, in order to provide access to the bag for filling, the fold 752 may be cut off (either before or after the web 750 is sectioned). This end portion may then be closed after filling of the bag, such as by heat sealing or adhesive.

Figure 23 illustrates another variation of the bags of the invention in which the mouth is spaced from the ends of the bag. Referring to Figure 23, the bag 560 includes a flat, stable base portion 508, the construction of which is preferably as described with reference to Figures 13 to 15, and with reference to Figures 16 and 17. The bag 560 also includes a closeable region 550 which may be closed in any of the ways previously described, after filling of the bag. The mouth 521 of the bag 560 is in the form of a slit or gap 562. The mouth 521 is closed by means of a closure flap 565 which overlies the gap 562. The closure flap is attached to the front face 561 of the bag by means of a region of peelable adhesive 563 and, at the other side of the gap 562, by means of a region of peelable or permanent adhesive 564. The closure flap includes lines of weakness 566 along which the closure flap 565 may be torn so that a portion 569 may be peeled back through the region of peelable adhesive 563 to expose the mouth 521.

Figure 24 illustrates one method of making the bag of Figure 23. In this method, a web 770 of plastics film is extruded and is folded over at fold 771 and 772 to the

configuration shown in Figure 24A. In Figure 24A, the spacing of the end edges 773, 774 of the web 770 is exaggerated for reasons of clarity. An optional third fold forming an optional second flap depending from edge 753 or 754 may also be included. This second flap is similar in construction and operation to the second flap depending from fold 602 in Figure 19.

Next, a tuck 775 is formed from fold 771 (Figure 24B) and mitre seals 776 are formed at the corners of the tuck portions (Figure 24C). Subsequently, fold 772 is cut away to provide an end 776 of the resulting bag open for filling (Figure 24D). A region or regions of peelable adhesive 777 is applied to the bag adjacent gap 778 and adhesive regions 779 are also applied on the opposite side of gap 778. Adhesive regions 779 may be peelable or non-peelable. The locations of the adhesive regions 777 and 779 may be reversed if desired (Figure 24E). An additional web 780, including lines of weakness 781, is then applied to the adhesive regions 777, 779 to overlie (and close) the gap 778 (Figure 24F). Finally, the web 770 is sectioned to form individual bags and the side edges are sealed, such as by heat sealing or adhesive. After filling of the bag, the open end 776 may be closed by suitable means in closeable region 782.

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